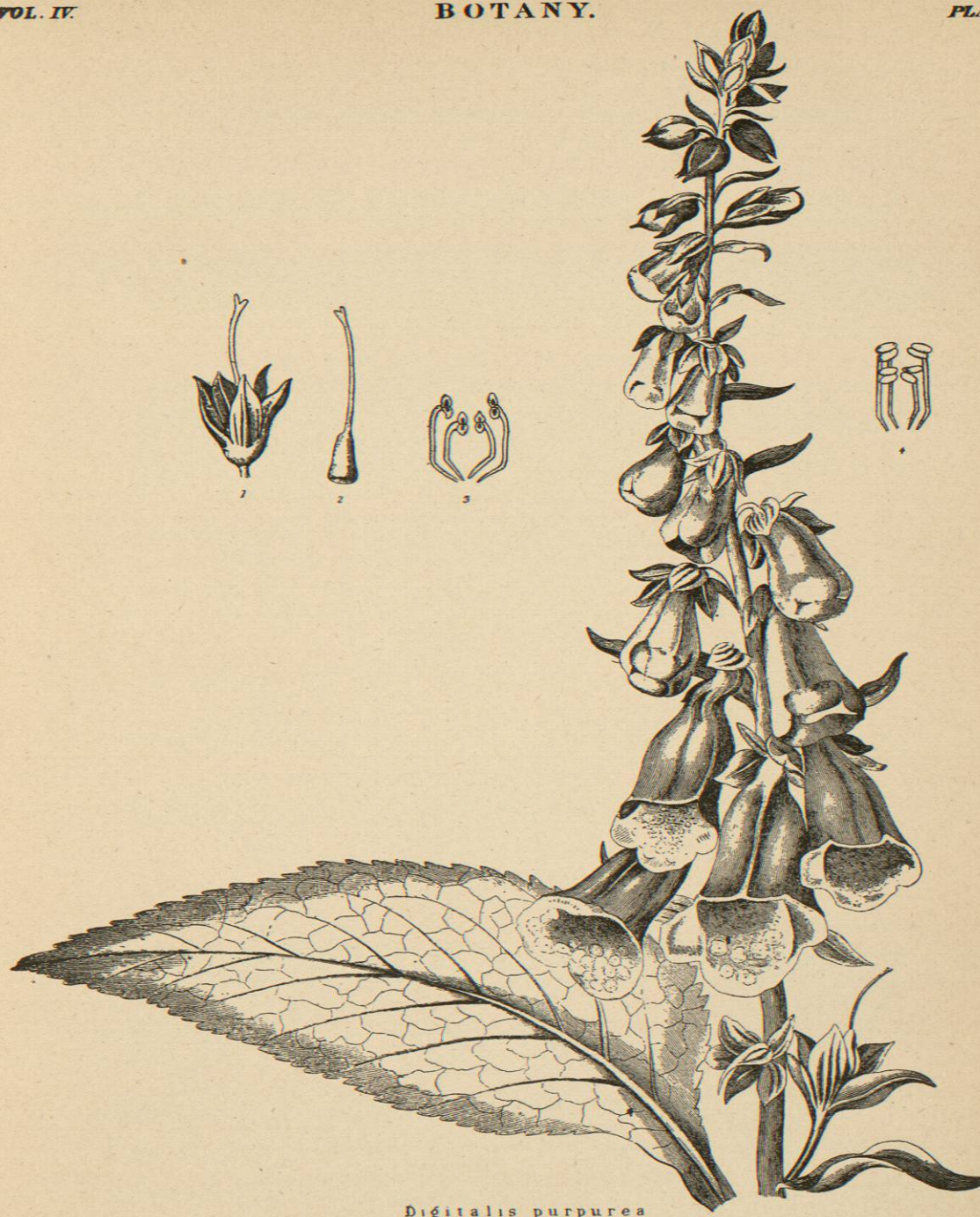


*Cuscuta verrucosa*  
(Warty Dodder)

Eng'd by G. Aitken del.



*Digitalis purpurea*  
(Purple Foxglove)

Eng'd by G. Aitken del.

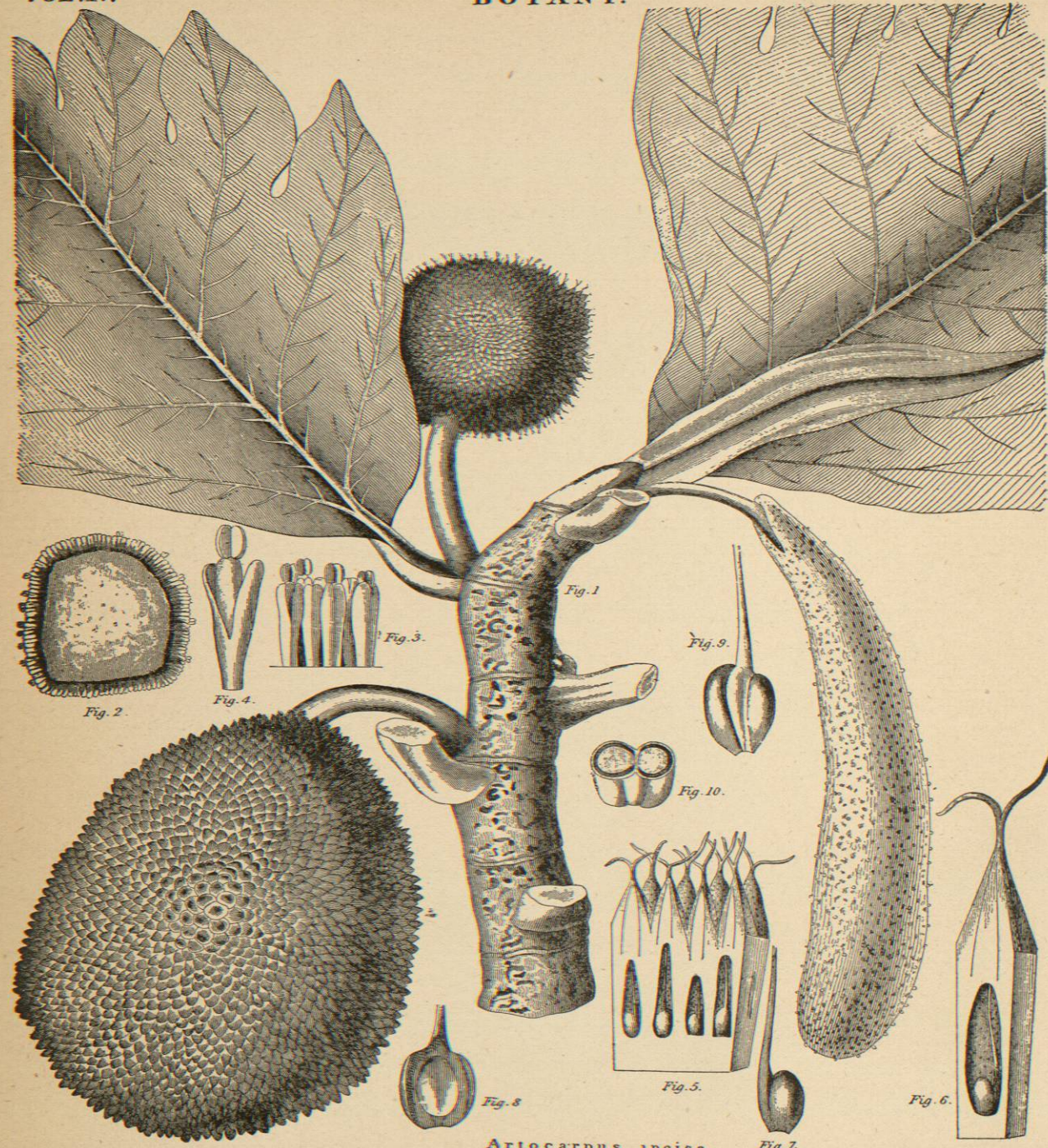


*Myristica moschata*  
(Nutmeg)

Eng. by W. Adams, B.A.



*Euphorbia hypericifolia*  
(Tutsan-leaved Spurge)

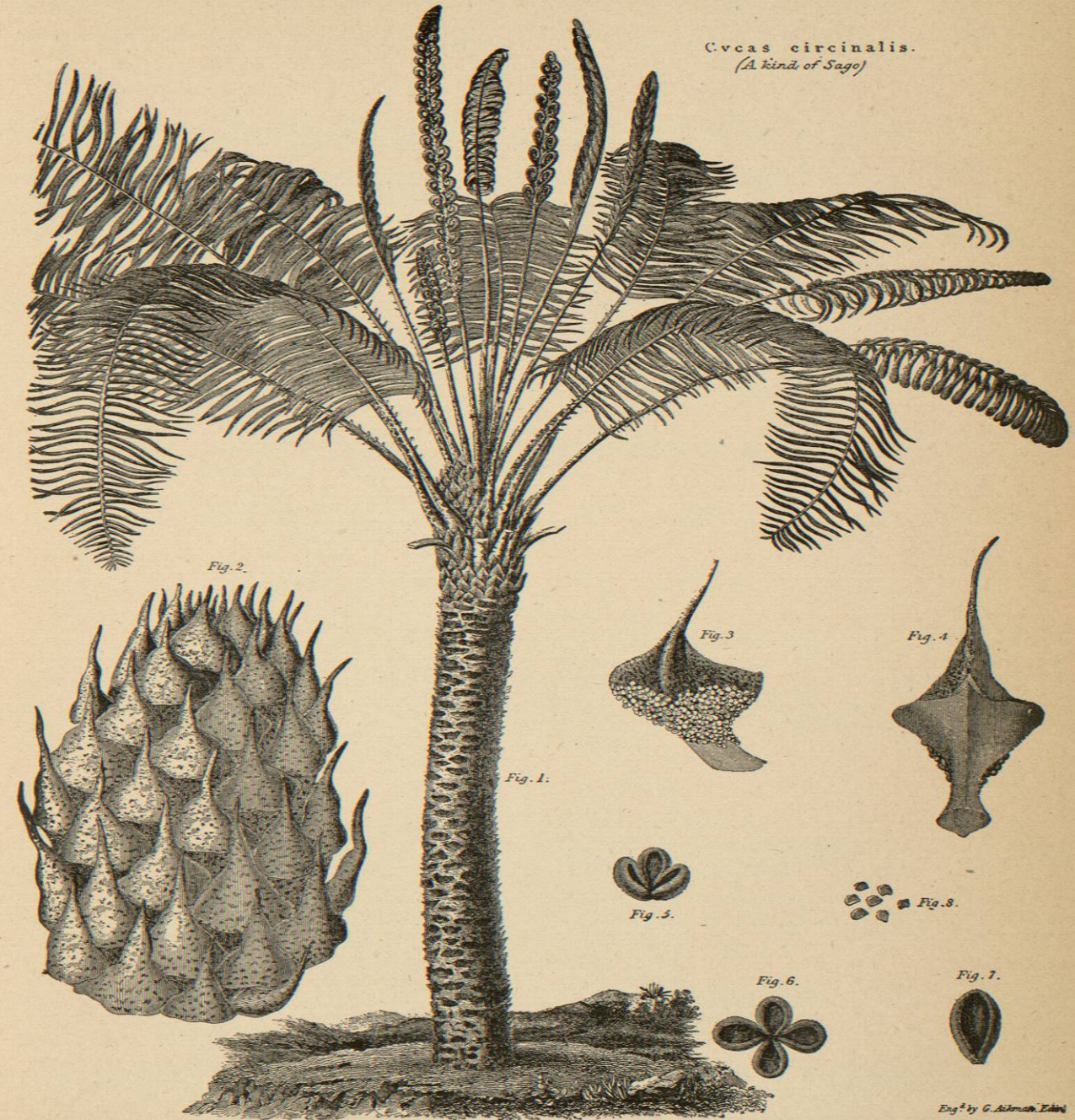


*Artocarpus incisa*  
(Bread-fruit Tree)

ENCYCLOPEDIA BRITANNICA, NINTH EDITION.

Eng<sup>d</sup> by G. Adnan.

*Cycas circinalis.*  
(A kind of Sago)



ENCYCLOPEDIA BRITANNICA, NINTH EDITION.

Eng<sup>d</sup> by G. Adnan.



Arum maculatum.  
(Cuckoo pine)

composed of three parts, while the other verticils have five; in Labiate flowers there are five parts of the calyx and corolla, and only four stamens; and in Tropeolum pentaphyllum there are five sepals, two petals, eight stamens, and three carpels. In all these cases the want of symmetry is traced to the suppression of certain parts. In the last-mentioned plant the normal number is five, hence it is said that there are three petals suppressed, as shown by the position of the two remaining ones; there are two rows of stamens, in each of which one is wanting, and there are two carpels suppressed. In many instances the parts which are afterwards suppressed can be seen in the early stages of growth, and occasionally some vestiges of them remain in the fully developed flower. By the suppression of the verticil of the stamens, or of the carpels, flowers become *unisexual*, or *diclinous*, and by the suppression of one or both of the floral envelopes, monochlamydeous and achlamydeous flowers are produced. The suppression of parts of the flower may be carried so far that at last a flower consists of only one part of one whorl. In the Euphorbiaceæ we have an excellent example of the gradual suppression of parts, where from an apetalous trimerous staminal flower we pass to one where one of the stamens is suppressed, and then to forms where two of them are wanting. We next have flowers in which the calyx is suppressed, and its place occupied by one, two, or three bracts (so that the flower is, properly speaking, achlamydeous), and only one or two stamens are produced. And finally, we find sterile flowers consisting of a single stamen with a bract, and fertile flowers consisting of a single carpel with a bract. There is thus traced a *degradation*, as it is called, from a flower with three stamens and three divisions of the calyx, to one with a single bract and a single stamen or carpel.

*Degeneration*, or the transformation of parts, often gives rise either to an apparent want of symmetry or to irregularity in form. In unisexual flowers it is not uncommon to find vestiges of the undeveloped stamens in the form of filiform bodies or scales. To many of these staminal degenerations Linnaeus gave the name of *nectaries*. In double flowers transformations of the stamens and pistils take place, so that they appear as petals. In Canna, what are called petals are in reality metamorphosed stamens. In the capitula of Compositæ we sometimes find the florets converted into green leaves. The limb of the calyx may appear as a rim, as in some Umbellifera; or as pappus, in Compositæ and Valeriana. In Scrophularia the fifth stamen appears as a scale-like body, called *staminodium*; in other Scrophulariaceæ, as in Pentstemon, it assumes the form of a filament, with hairs at its apex in place of an anther.

*Cohesion*, or the union of parts of the same whorl, and *adhesion*, or the growing together of parts of different whorls, are very common causes of change both as regards form and symmetry. Thus in Cucurbita the stamens are originally five in number, but subsequently some cohere, so that three stamens only are seen in the mature flower. Again, amongst Malvaceæ the stamens cohere by their margins. Cases of what are called gamopetalous corollas, gamosepalous calyces, &c., must be distinguished carefully from such a process as this; for in these cases the parts were never free from one another, but developed from the very first as one mass; and the same caution is necessary in many instances of so-called union of stamens, which are really cases of branching. Adhesion is well seen in the *gynostemium* of Orchids, where the stamens and ovary adhere; and in flowers where the stamens are *perigynous*, i.e., are adherent to the calyx. In Capparidaceæ the calyx and petals occupy their usual position, but the axis is prolonged in the form of a gynophore, to which the stamens are united. Cohesion and adhesion are rare amongst Monocotyledons.

*Multiplication*, or an increase of the number of parts,

gives rise to changes in plants. We have already alluded to the interposition of new members in a whorl. This takes place chiefly in the staminal whorl, but usually the additional parts produced form a symmetrical whorl with the others. In some instances, however, this is not the case. Thus in the Horse-chestnut there is an interposition of two stamens betwixt the other whorl, and thus seven stamens are formed in the flower, which is unsymmetrical.

Parts of the flower are often increased by a process of *deduplication*, *unlining*, *dilamination*, or *chorization*, i.e., the splitting of a part so that two or more parts are formed out of what was originally one. This is believed by some to take place in a remarkable degree in the case of appendages to petals. Thus, in Ranunculus, the petal has a scale at its base, which is looked upon as a mere fold of it. This fold may in some cases be more highly developed, as in Caryophyllaceæ, and in Crassula rubens (fig. 172, a). Others refer such cases to the formation of outgrowths similar in nature to the ligule in Grasses. In Cruciferous plants a case of chorisis is said to occur. There the staminal whorl consists of four long stamens and two short ones (*tetradynamous*). The symmetry in the flower is evidently dimerous, and the abnormality in the androecium, where the four long stamens are opposite the posterior sepals, is said to take place by a splitting of the filaments of two stamens into four; and thus the two long stamens on each side are, by *gemination*, normally one. This view is supported by cases in which the filaments of the long stamens are more or less united; also by cases in which the shorter filaments exhibit tooth-like processes on both sides, while the longer ones have them only on the outer side. In such cases the two long filaments, if united, would present the same appearance as the shorter ones, and occupy their usual position of alternation with the petals. In some instances, by *pelorization*, it is found that tetradynamous plants become tetrandrous, with stamens of equal length alternating with the petals. Many cases of what was considered chorisis are in reality due to the development of stipules from the staminal leaf. Thus in Dicentra and Corydalis there are six stamens in two bundles; the central one of each bundle alone is perfect, the lateral ones have each only half an anther, and they are really stipules formed from the staminal leaf. Branching of stamens also produces apparent want of symmetry; thus, in the so-called polyadelphous stamens of Hypericaceæ there are really only five stamens which give off numerous branches, but the basal portion remaining short, the branches have the appearance of separate stamens, and the flower thus seems unsymmetrical.

*Cultivation* has a great effect in causing changes in the various parts of plants. Many alterations in form, size, number, and adhesion of parts are due to the art of the horticulturist. The changes in the colour and forms of flowers thus produced are endless. In the Dahlia the florets are rendered quilled, and are made to assume many glowing colours. In Pelargonium the flowers have been rendered larger and more showy; and such is also the case with the Ranunculus, the Auricula, and the Carnation. Some flowers, with spurred petals in their usual state, as Columbine, are changed so that the spurs disappear; and others, as Linaria, in which one petal only is usually spurred, are altered so as to have all the petals spurred, and to present what are called *pelorian* varieties.

As a convenient method of expressing the arrangement of the parts of the flower, floral formulæ have been devised. Several modes of expression are employed. The following is a very simple mode which has been proposed:—The several whorls are represented by the letters S sepals, P petals, St stamens, C carpels, and a figure marked after each indicates the number of parts in that whorl. Thus the formula S<sub>5</sub>P<sub>5</sub>St<sub>5</sub>C<sub>5</sub> means that the flower is perfect, and has